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AUGUST 7.

Mr. CHARLES MORRIS in the chair.

Six persons present.

AUGUST 14.

Mr. CHARLES MORRIS in the chair.

Nine persons present.

AUGUST 21.

Mr. CHARLES MORRIS in the chair.

Six persons present.

AUGUST 28.

Mr. THOS. MEEHAN, Vice-President, in the chair.

Fifteen persons present.

Some Evidences of Great Modern Geological Changes in Alaska.—Mr. THOMAS MEEHAN exhibited a piece of wood taken from a prostrate tree, in what appeared to have been a sunken forest in Alaska. It was in Hood's Bay, as marked on some charts, on a peninsula formed by the junction of Glacier Bay and Lynn Channel, and facing Cross Sound, in lat. $58^{\circ} 30'$. The arboreal vegetation generally prevailing in this section consists of *Abies Sitkensis* (*A. Menziesii* of many botanists); *Abies Mertensiana*, the western hemlock spruce; and *Thuja gigantea*, called here "cedar" and "white cedar." *Thujopsis borealis* is said to "abound" in these districts by some authors, but Mr. Meehan remarked that though looking for it through many hundred miles along the shores of the inland seas in southeastern Alaska, he did not see one specimen. The trees in the forest are of all ages, from young seedlings to aged decaying and dead ones. But in sailing into Hood's Bay he noted that the forests all had a comparatively young look—few of the trees appearing over fifty years old. The shores were high—at the point where he landed not less than fifty feet above tide-water—and the soil was sand, or of glacial production. Across from here to Lynn Channel the distance might be about twelve miles, and, so far as could be judged, the soil and trees across were of the same character; and

it appeared the same up and down the peninsula for miles. Along the shore he found numerous prostrate trees, and upright stumps which had been ground off a few feet above the surface. The stumps could be seen extending down below low-water mark, and they extended up to the bottom of the highland at high-water mark, where the mud in which they had grown was covered by the glacial deposit already referred to. The wood exhibited was part of one of these prostrate trunks, and is evidently the same species as that now existing on the land, *Abies Sitkensis*. It is quite sound, and exhibits no evidence of great age since it became covered with the drift. The shores are strewn with rocks and stones of various classes, as usual in cases of glacial deposits. On one of the prostrate trunks—the one from which the piece of wood exhibited was taken—there lies a block of granite which, by measurement, was found to contain 2214 cubic feet. This trunk was partially bent in the middle by the weight of the huge block of stone, showing that the block had fallen on it, while the ground beneath the trunk was comparatively soft. Near this, but so far as could be seen not on any trunk, was a much larger mass of granite, comprising 3888 cubic feet. The whole of the circumstances pointed to the almost certainty that there had been a sudden subsidence of the land, and that with the subsidence there was a flow of water with icebergs on which were these huge rocks, and which crushed the trees and tore off those which were strong enough to resist; and that subsequently to the destruction of the forest, the whole surface became covered to a great depth with drift. Since that time there must have been an elevation of the land, and the remains of the trees are again brought to their original surface, but with a deep bed of earth above them. Mr. Meehan believed that the botanical facts might afford a clue to an approximation to the time when these events occurred. The youth of the living forest indicated that, at the farthest, it could not have been more than a few hundred years since the elevation occurred. As already noted, the trees in the immediate vicinity appeared to be but about fifty years since germination; but unless the original parent trees which furnished the seed for the uplifted land were near by, it might take some years for the seed to scatter from bearing trees, grow to maturity, again seed, and in this way travel to where we now find them. But as original forests were evidently not so very far distant, two or three hundred years ought to cover all the time required. The Rev. Mr. Corlies, a missionary at Juneau, or Harrisburg as it is marked on some charts, informed the speaker that an Indian chief had told him that about seven or eight generations ago, as tradition told them, there had been a sudden and terrible flood in that land, and only a few Indians had escaped in a large canoe. The probable identity of the sunken trees with the present species, and the freshness of the wood, would indicate no very great date backwards at which the original subsidence occurred.

In connection with the subject of the comparative recentness of great geological changes as indicated by botanical evidence, Mr. Meehan referred to an exposure of the remains of a large forest near the Muir glacier, one of five huge ones which form the head of Glacier Bay, between lat. 59° and 60° . This glacier is at least two miles wide at the mouth, and has an average depth of ice at this spot of perhaps five hundred feet. At the present time there is not a vestige of arboreal vegetation to be seen anywhere, except some willows on the hillsides, some miles from huge hills of drift piled up everywhere around. The river which flows under the glacier, and which has a volume equal to the Schuylkill at Philadelphia, does not flow into the bay from under the ice at the face, but rushes out in a mighty torrent on the northwest side, a few miles above the mouth, and has cut its way through mountains of drift, the gorge being many hundred feet in width, and the sides from two hundred to five hundred feet high. The torrent through the bed is now comparatively level, carrying with it an immense quantity of heavy stones, some of which must have comprised masses of six or eight cubic feet. Along the sides of this gorge were the exposed trunks, all standing perfectly erect, and cut off at about the same level. Some were but a few feet high, and others as much as fifteen—the difference arising from the slope of the ground on which the trees grew. These trunks were of mature trees in the main, and were evidently of *Abies Sitkensis*, with a few of either *Thuja gigantea* or *Juniperus*, perhaps *Occidentalis*, the uncertainty arising from the imperfection of the bark—what there was of this indicating the former, while an eccentricity of outline of the wood, not uncommon in *Juniperus*, favoring the latter view. These trees must have been filled in tightly by drift to the height of fifteen feet before being cut off, or the trunks now standing would have been split down on the side opposite to that which received the blow, and the grinding off could not have been many years after, or the dead trees would have lost their bark, as they always do when under varying conditions of heat and moisture. The facts seemed to him to indicate that the many feet of drift which had buried part of the trees in the first instance was the work of a single season, and that the subsequent total destruction of every vestige of these great forests was the work of another one soon following. As in the case of the facts noted in Hood's Bay, Mr. Meehan believed that the conclusion was justified that the total destruction of the forests here, the covering of their site by hundreds of feet of drift, and the subsequent exposure to view of their remains, were all the work of but a very few hundred years.

Mr. Charles Peabody was elected a member.